

Application No. 10/052,987

REMARKS

Claims 1 to 20 are pending in the application. Claims 1, 5 to 7, 10, 19, and 20 stand rejected under 35 U.S.C. §102(e) as being anticipated by Wexler (U.S. Patent 6,297,296). Claims 2 to 4, 8, 9, 11, 12, 16, and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wexler in view of Gundlach et al. (U.S. Patent 6,054,505). Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Wexler in view of Gundlach et al. and Mayo et al. (U.S. Patent 6,174,355). Claims 14, 15, and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Wexler in view of Gundlach et al. and Deardurff et al. (U.S. Patent 5,788,754).

Applicants respectfully traverse the rejections of the claims. The present invention is directed to a process which comprises (a) preparing a first solution comprising water and an anionic dye, said solution containing the dye in an amount of at least about 2 percent by weight; (b) preparing a second solution comprising water and a polyquaternary amine compound selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallyl amines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof; (c) admixing the first solution and the second solution, thereby causing formation of a complex of the anionic dye and the polyquaternary amine compound and precipitation of the complex from the solution; and (d) isolating the complex thus formed. Another embodiment of the present invention is directed to a process for preparing an ink composition which comprises

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(1) preparing a complex of an anionic dye and a polyquaternary amine compound by a process which comprises (a) preparing a first solution comprising water and an anionic dye, said solution containing the dye in an amount of at least about 2 percent by weight; (b) preparing a second solution comprising water and a polyquaternary amine compound selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallyl amines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof; and (c) admixing the first solution and the second solution, thereby causing formation of a complex of the anionic dye and the polyquaternary amine compound and precipitation of the complex from the solution; and (2) admixing the complex thus formed with an organic cosolvent.

Wexler discloses the use of cationic latex particles that can complex with anionic dyes to provide water fastness and further to provide a medium in which inherently unstable anionic dyes can be brought in close proximity with other anionic components, by complexation to cationic latices, in order to stabilize the anionic dyes especially with regard to light and oxidative degradation. In particular the disclosed compositions provide for methods of generating waterfast and improved lightfast ink jet images.

The Examiner has rejected claims 1, 5 to 7, 10, 19, and 20 under §102(e) as being anticipated by Wexler. Applicants have amended claims 1, 6, and 19 as indicated to include therein specific polyquaternary amine compounds. Since, as the Examiner has stated,

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Wexler does not teach these specific polyquaternary amines, Applicants believe that this amendment eliminates any possible basis for this ground for rejection.

The Examiner has also rejected claims 2 to 4, 8, 9, 11, 12, 16, and 17 under §103 as being unpatentable over Wexler in view of Gundlach et al. Gundlach et al. discloses an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; and (3) a colorant comprising an anionic dye complexed with a polyquaternary amine compound. Also disclosed is an ink composition which comprises (1) water; (2) a nonpolymeric salt comprising at least one cation and at least one anion; (3) an anionic dye; and (4) a polyquaternary amine compound. In one embodiment, the polyquaternary amine compound is selected from the group consisting of polydiallyl ammonium compounds, polyquaternized polyvinylamines, polyquaternized polyallylamines, epichlorohydrin/amine copolymers, cationic amido amine copolymers, copolymers of vinyl pyrrolidinone and a vinyl imidazolium salt, and mixtures thereof.

The Examiner has stated that Wexler discloses a process which comprises mixing water/anionic dye with water/polyquaternary amine to cause formation of a complex of anionic dye and polyquaternary amine, precipitation of the complex, and isolation of the formed complex, that the reference also discloses a process of preparing an ink jet ink composition which comprises adding the anionic dye-polyquaternary amine complex formed from the above process to an ink carrier which comprises organic cosolvent, including alcohols and

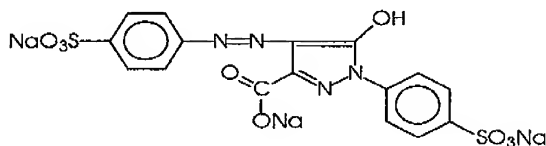
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ketones, that the anionic dye includes Acid Yellow 23, Acid Red 52, Acid Blue 9, and Direct Blue 199, that the reference also discloses a method of printing the ink comprising incorporating the ink into a thermal ink jet printer followed by ejecting the ink onto a substrate, that the difference between Wexler and the present claimed invention is the requirement in the claims of (a) specific types of polyquaternary amine, and (b) nonpolymeric salt, that with respect to difference (a), Gundlach et al., which is drawn to an ink jet ink comprising a complex of anionic dye and a polyquaternary amine, discloses the use of polyquaternary amines such as polydimethyldiallyl ammonium, polyquaternized polyvinylamine, polyquaternized polyallylamine, epichlorohydrin/amine copolymers, cationic amido amine copolymers, and copolymers of vinyl pyrrolidone and vinyl imidazolium, that these polyquaternary amine compounds are capable of forming complexes with an anionic dye to produce an ink with bright color and high waterfastness, and that with respect to difference (b), Gundlach et al. discloses the use of 0.1 to 40 percent nonpolymeric salt to improve the stability of the anionic dye-polyquaternary amine complex. The Examiner is of the position that it would have been obvious to one of ordinary skill in the art to use the specific polyquaternary amine compounds disclosed by Gundlach et al. in the ink of Wexler to produce an ink with bright color and high waterfastness, and to use a nonpolymeric salt in the ink of Wexler to improve stability of the anionic dye-polyquaternary amine complex, thereby arriving at the instantly claimed invention.

Applicants disagree with this position. With respect to claim 3 (which has been cancelled and the limitations of which have

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been incorporated into claim 1) and claim 4, as well as claims 11, 12, 16, and 17. Applicants point out that Wexler teaches admixing a cationic latex suspension with a solution containing a dye in an amount of 0.017 Molar (column 8, lines 12 to 15). In contrast, claim 1 (and the claims depending therefrom) recite that the solution containing the dye contains the dye in an amount of at least about 2 percent by weight. Using the example of Tartrazine, also known as Acid Yellow 23, of the formula



having a molecular weight of about 534.37, which was used in Wexler, a Molarity of 0.017M dye in solution is equivalent to an amount of about 0.9 percent by weight dye in solution, as can be seen by the following calculation:

$$\frac{0.017 \text{ mol dye}}{1 \text{ L solution}} \times \frac{534.37 \text{ g}}{1 \text{ mol}} \times \frac{1 \text{ L}}{1,000 \text{ g}} = \frac{0.908 \text{ g dye}}{100 \text{ g solution}}$$

In contrast, an amount of at least about 2 percent by weight dye in the solution is equivalent to a Molarity of about 0.037M dye in the solution, as can be seen by the following calculation:

$$\frac{2 \text{ g dye}}{100 \text{ g solution}} \times \frac{1 \text{ mol dye}}{534.37 \text{ g dye}} \times \frac{1,000 \text{ g water}}{1 \text{ L water}} = \frac{0.037 \text{ mol dye}}{1 \text{ L solution}}$$

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Accordingly, Applicants are of the position that claim 1 and the claims depending therefrom are patentable with respect to the teachings of these references viewed in combination. In addition, Applicants believe that new claims 21 to 25, which recite amounts of dye of at least about 2 percent by weight or at least about 5 percent by weight, are also particularly in condition for allowance.

In addition, with respect to claims 6, 19, and the claims depending therefrom, Applicants point out that Wexler teaches an ink containing latex particles of a cationic or charged polymer, said particles having a size from 10 nanometers to 10 microns (column 3, lines 47 to 48), said cationic latex being complexed to an anionic organic colorant and an anionic stabilizing compound. In contrast, Gundlach et al. teaches a complex of an anionic dye and a polyquaternary amine that is soluble in the ink. (See, for example, column 23, lines 49 to 54.) Accordingly, Applicants are of the position that one of ordinary skill in the art would not be motivated to combine the teachings of Wexler, which teaches cationic latex particles complexed with a colorant and a stabilizer, with the teachings of Gundlach et al., which teaches a soluble polyquaternary amine complexed with an anionic dye.

The Examiner appears to have considered various portions of the references cited, in each instance viewing the cited portion in isolation from the context of the entire reference, and combined these isolated portions to arrive at the present invention with the benefit of hindsight. Using hindsight or applying the benefit of the teachings of the present application when determining obviousness, however, is impermissible; the references applied must be reviewed

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without hindsight, must be reviewed as a whole, and must suggest the desirability of combining the references. Lindemann Maschinenfabrik v. American Hoist & Derrick Co., 221 U.S.P.Q. 481 (Fed. Cir. 1984). None of the cited references suggests or teaches the desirability of combining the elements of the present invention as claimed. Obviousness cannot be established by combining references to arrive at the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987); Carella v. Starlight Archery and Pro Line Co., 804 F.2d 135, 231 U.S.P.Q. 644 (Fed. Cir. 1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. (BNA) 929 (Fed. Cir. 1984). When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. Uniroval Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); Interconnect Planning Corp. v. Fell, 774 F. 2d 1132, 227 U.S.P.Q. 543 (Fed. Cir. 1985). It is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention. Uniroval Inc. v. Rudkin Wiley Corp., __ F. 2d __, 5 U.S.P.Q. 2d 1435 (Fed. Cir. 1988); W. L. Gore and Associates, Inc. v. Garlock, Inc., 721 F. 2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983). The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the

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prior art, not in the applicant's disclosure, In re Dow Chemical, 5 U.S.P.Q. 2d 1529 (Fed. Cir. 1988).

The present invention as recited in instant claims 6, 19, and the claims depending therefrom, recite a process for making an ink wherein the ink contains a nonpolymeric salt and wherein the complex of the anionic dye and the polyquaternary amine compound is soluble in the ink. (Support for these amendments can be found at, for example, claim 8 (now cancelled), page 41, lines 18 to 22, and pages 36 and 37, bridging paragraph.) Accordingly, Applicants are of the position that these claims are patentable with respect to the cited references.

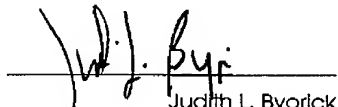
The Examiner has rejected claim 13 under §103 as being unpatentable over Wexler in view of Gundlach et al. and Mayo et al. and has rejected claims 14, 15, and 18 under §103 as being unpatentable over Wexler in view of Gundlach et al. and Deardurff et al. Applicants are of the position that these claims are patentable for the same reasons set forth hereinabove with respect to the rejection of claims 2 to 4, 8, 9, 11, 12, 16, and 17 under §103 as being unpatentable over Wexler in view of Gundlach et al.

Applicants believe that the foregoing amendments and distinctions place the claims in condition for allowance, and accordingly respectfully request reconsideration and withdrawal of all grounds for rejection.

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In the event the Examiner considers personal contact advantageous to the disposition of this case, she is hereby authorized to call Applicant(s) attorney, Judith L. Byorick, at Telephone Number (585) 423-4564, Rochester, New York.

Respectfully submitted,


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